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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

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August 5, 1993

Mr. William Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

RE: Ex Parte Filing
Personal Communications Services
GEN Docket No. 90-314;
Emerging Technologies
ET Docket No. 92-9

Dear Mr. Caton:

Enclosed are an original and one copy of a document addressing the bandwidth requirements for new personal communications services. On this date, Lisa Hook, Carol Melton, and I provided copies of the enclosed document to Randall Coleman, Linda Oliver, Byron Marchant and Robert Pepper during meetings in which we discussed the subject of the enclosure. Please associate this material with the above-captioned dockets.

Sincerely,

Alex D. Felker

Enclosure

No. of Copies rec'd 0+1
List A B C D E

Personal Communications Services

PCS Defined

- "next generation mobile" (voice, video, data)
- Four service tiers: residential, neighborhood, auto & work place

PCS Goals

- *Affordable* to average Americans
- Competitive with cellular and "wireline" service
- Introduces new services, added convenience

Requirements for PCS Success

- Advanced US Technology
- Proper Regulatory Treatment:
  - **Assignment of 40 MHz or more**
    - ✓ Lowers subscriber cost by increasing trunking efficiency and reducing infrastructure needs
    - ✓ Ensures PCS quality and coverage on par with cellular
  - **Not more than 2 PCS Licenses/Market**
    - ✓ Lowers subscriber cost by ensuring customer base adequate to cover high network costs
    - ✓ Ensures vigorous local competition (Five competitors)
  - **National or Regional Assignment Areas**
    - ✓ Lowers subscriber costs by allowing efficient network layout
    - ✓ Efficient market size proven by cellular consolidation
  - **Celcos should be ineligible within service areas**
    - ✓ Celcos already can offer PCS
    - ✓ Celco eligibility would reduce competition & raise consumer prices

PCS Assignment Bandwidth of at Least 40 MHz Is Required To:

- Support Vocoder and Data Rates Competitive with Existing Wire/Wireless Nets
- Facilitate Prompt Service Availability via Band Sharing with Incumbents
- Lower Subscriber Costs
  - Increases trunking efficiency
  - Decreases investment in frequency reuse
- **Establish Coverage/Capacity Parity Between 2 GHz PCS and 800 MHz Cellular**

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30 MHz Does Not Facilitate PCS/Microwave Co-Existence

- **Microwave channels are generally 10 MHz**
  - Receiver passbands frequently wider than 10 MHz
  - Adjacent channels generally vacant
- **40 MHz pairing (20 X 20 MHz) allows access to some spectrum immediately**
- **30 MHz pairing (15 X 15 MHz) can result in**
  - Competitors jointly negotiating with microwave licensee
  - Inability to use any portion of assignment in certain congested areas

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DIFFERENCES IN PHYSICAL PROPERTIES OF 800 MHZ AND 2 GHZ

- Higher frequency signals propagate more poorly in free space
  - Results in 7.25 dB greater path loss at 2 GHz
  - Cannot be compensated with higher gain antennas
- Greater building attenuation
- Greater fading at 2 GHz
  - For equivalent coverages, implies greater average received power

If the effects of these properties are not offset, 2 GHz PCS systems will require at least 4 times as many cell sites as 800 MHz cellular systems for comparable levels of coverage & capacity

CELLULAR/PCS PARITY

TO PUT PCS COVERAGE & CAPACITY ON PAR WITH CELLULAR REQUIRES:

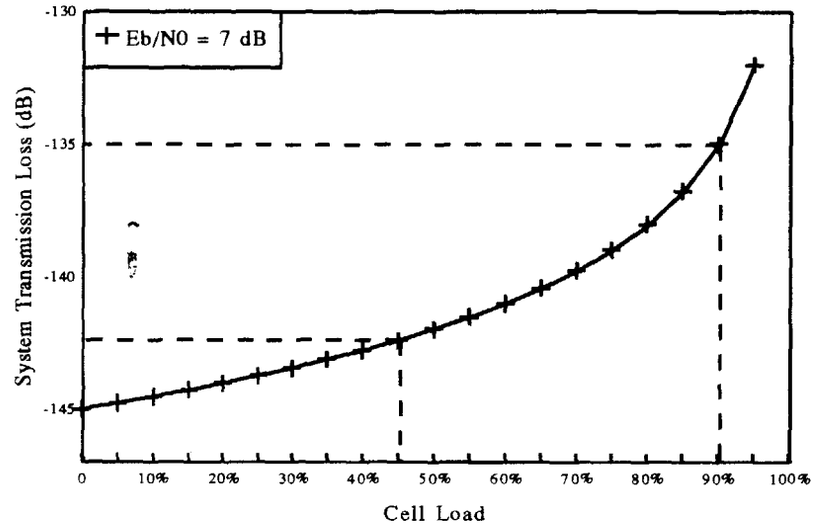
- Equivalent numbers of base stations and comparable power levels
- Sufficient spectrum to make PCS traffic handling capacity comparable to cellular

Q-CDMA PERMITS COVERAGE/CAPACITY TRADEOFF

For a given radiated power level:

- Coverage may be increased by reducing number of active voice channels
- Number of voice channels may be increased by reducing coverage

Q-CDMA SYSTEM TRANSMISSION LOSS IS A FUNCTION OF LOADING



To obtain coverage and capacity parity with cellular's 25 MHz, PCS must have at least 40 MHz of **CLEAR** spectrum

$$T(r) = CNR_{min} + (N_0W)_c - p_t - 10\log(1-X)$$

Where,
X = Loading Factor

Source: The CDMA Network Engineering Handbook
Vol. I, Qualcomm, Inc; November 23, 1992